Packet delivery – review

- Suppose we set up a session with some "corresponding node" (CN) on the internet (e.g., YouTube)
- The process:
    o Packet starts out at CN, destined for HNA; home agent is on the path from CN to HNA.
    o Home agent sees the packet destined for HNA. Home agent looks up the HNA's entry in the location registry to find the COA.
    o Home agent repackages the packet as the data in a new IP packet, with the COA as the destination.
    o Packet arrives at the foreign agent (COA). Foreign agent examines the original header of the packet to determine the true destination in the foreign network.
- In reverse, the mobile node returns packets to the source with its HNA as the source and the CN as the destination.
- These packets are sent directly through the internet and the intervention of the HA is not required.

(Fig. 1)

- Thus a virtual network tunnel is set up from CN to mobile node, and the mobility of the mobile node is hidden from the CN (which is what we needed).
- (Example)

Mechanics of Mobile IP

- How does the mobile node figure out what agents to use? Or how does it know that it has moved?

- Two methods:
    - Agent advertisement: Foreign agents and home agents will periodically advertise their presence by sending agent advertisement messages. This method uses the Internet Control Message Protocol (ICMP) and is similar to the way routers advertise themselves on the wired internet.
    - Agent solicitation: If a mobile node doesn't receive an agent advertisement, it can ask for one, again similarly to looking for routers on the wired internet.
    - (Example)
- Registration: needed to inform HA of the mobile node's current location – allows HA to update its location registry
- After discovering the FA, the mobile node sends a registration request to the FA – the FA then forwards it to the HA.
- On receipt, the FA updates its registry by setting up a mobility binding
- Mobility bindings contain the HNA, the COA, and a lifetime – the binding is deleted once the lifetime has expired
- (Example)

(Fig. 2)

Analysis

- What happens when the mobile node moves from one foreign network to another?

- Agent advertisement/solicitation messages and registration must be performed
- However, in the meanwhile, the mobile node has switched networks, and is in the "wrong" subnet as far as routing is concerned
- Message traffic during network change

(Fig. 3)

- Packets may be in transit during the switchover in networks. How many packets are lost?
- Notation:
    - $t_{MN \rightarrow FAi}$ = delay from mobile node to i-th FA
    - $t_{HA \rightarrow FAi}$ = delay from HA to i-th FA
    - $t_{CN \rightarrow HA}$ = delay from CN to HA
    - d_{DATA} = duration of data packet
- Assumptions: control packets have negligible duration; no delay for computation; no errors.
- Based on the figure, the total delay between the link breaking and being re-established is

(Eq. 1)